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PART II

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

FLOTATION STANDARDS FOR BOATS

Final Rule

Title 33—Navigation and Navigable Waters

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 75-168]

PART 183—BOATS AND ASSOCIATED EQUIPMENT

Flotation Standards for Boats

AGENCY: Coast Guard, DOT.

ACTION: Final Rule.

SUMMARY: These amendments to the Coast Guard flotation standard are designed to increase the visibility and survivability of boaters following a boating accident, by requiring manufacturers to design certain boats less than 20 feet in length to float in an approximately level attitude when swamped, thus providing a platform from which the occupants can be rescued.

EFFECTIVE DATE: This regulation is effective on August 1, 1978, however, manufacturers may voluntarily comply with the regulations at the time of this publication.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590 (202-426-1477).

SUPPLEMENTARY INFORMATION: A notice of proposed rulemaking for this amendment was published in the FEDERAL REGISTER on April 29, 1976. The public comment period ended July 30, 1976. All of the comments received were carefully considered, and some changes have been made to the regulation as a result of the comments.

The principal persons involved in drafting this rule are: Mr. Lars Granholm, Project Manager and Lieutenant Edward J. Gill, Jr., Project Attorney.

DISCUSSION OF COMMENTS

Passenger carrying area. One commentor requested that §§ 183.205 and 183.305, which define passenger carrying areas, be modified to include an explanation of how the length of the passenger carrying area is established on a boat that has a cabin. The commentor pointed out that the passenger carrying area extends into the cabin of the boat, but the proposed regulation does not specify how the length of the passenger carrying area inside the cabin is determined. The commentor suggested that the length of the passenger carrying area should extend into the cabin of the boat to a place where there is a clearance dimension of at least two feet between the cabin top and the waterline in the swamped boat. The commentor pointed out that tests with persons demonstrated a strong reluctance by passengers in swamped boats to enter low, cuddy-cabins where the headroom above the water inside the boat is less than 12 inches. However, the tests indicated that people are willing to enter the cabin area if the clearance is more than 12 inches.

The merits of this comment have been evaluated and the comment is accepted. Paragraphs 183.205(c) and 183.305(c) and new illustration, Figure 6, are added to this rule to indicate that the length of the passenger carrying area extends into the cabin to a place where there is a minimum vertical distance of two feet between the inside cabin top and the surface of the water inside the swamped boat.

Test weight. One commentor requested that the requirement in §§ 183.230(c)(2) and 183.330(c)(2), which requires that test weights have their center of gravity four inches above the floor or seat, be reduced to two inches. The commentor had participated in some tests where the weights used had a center of gravity two inches above the floor or seat.

This comment is rejected. The weights are used in the stability test to simulate the center of gravity of persons sitting on the boat seats or kneeling on the floor while helping somebody climb into the boat. If the regulation were changed by making the center of gravity two inches above floor or seats, the test would no longer simulate the distribution and weight of people inside a swamped boat.

One error was, however, noticed in §§ 183.230(c)(2) and 183.330(c)(2). The proposal required that each weight placed on floor or seat must have its center of gravity at least four inches above the floor or seat. This is in error. The intent of the rule is not that each individual weight must meet the requirement, but that the mass of weight, which is composed of all of the individual weights that are placed on a seat or on the floor, have its center of gravity located at least four inches above the floor or seat. Paragraphs 183.230(c)(2) and 183.330(c)(2) are modified by replacing the word "each," which appears before the words "weight placed on the floor in" and "weight placed on a seat," with the phrase "the amount of."

Quantity of flotation required. A manufacturer suggested that a formula for determining the required amount of flotation be included as an alternative to having to test a boat by submerging it in a test tank in order to determine compliance with this rule. The formula approach is based on variable factors such as density of construction material and expansion of flotation foam. Because of these variable factors, this suggestion is not accepted. Unless a manufacturer actually tests his boat by swamping it, he cannot be absolutely sure that the boat has sufficient flotation to comply with this rule.

One commentor asked if the proposed standards have been thoroughly tested to determine whether or not a boat that meets the requirements of §§ 183.202 or 183.302 will be difficult to right if it capsizes. The commentor is concerned, because he feels that a boat that floats level upside down will be difficult to right, and that a boat in this condition will not provide a platform from which the victims can be rescued.

Extensive testing was performed to establish that a boat that complies with these rules is very unlikely to turn upside down and that it can be turned right side up in case it capsizes. For these reasons, the rule is not changed in response to this comment.

One commentor proposed that a label that states how much inherent buoyancy the boat has be placed on the boat. This comment is rejected. A boat's inherent buoyancy is taken into consideration in determining the amount of flotation the boat is required to have under these regulations. The persons capacity is stated on the boat's capacity label. The addition of a boat's inherent buoyancy to the label might mislead the occupants into believing that the boat can carry a heavier load than is safe for it to carry.

Preconditioning for tests. One commentor suggested that §§ 183.220(b)(2) and 183.320(b)(2) be modified by deleting the reference to the weight shown in column 6 of Table 4. Column 6 of Table 4 contains the weight of various sized outboard motors and their related equipment. If the reference to Table 4 is removed from §§ 183.220(b)(2) and 183.320(b)(2), the weight of the motor and its related equipment would not be included when the boat is tested for compliance with these rules. The result of this change would require the persons in a swamped boat to remove the engine before the boat would assume the level floating attitude required by these rules. The commentor argues that this result is desirable because it lessens the weight the boat has to support and because it is easy to jettison an outboard engine from a swamped boat.

If a boat will float level only when the outboard engine is removed, the swamped boat, with the engine attached, will float at an angle with the engine below the water surface. In order to jettison the engine without altering the boat's stability, a person would have to dive down into the water to release the engine from the boat. This would be extremely difficult for a person wearing a personal flotation device (PFD). For this reason, the comment is rejected.

Flotation test for persons capacity. One commentor suggested that the flotation test for persons capacity in §§ 183.225 and 183.325 be changed to include different floating attitude requirements for dinghies than for larger boats. He claimed that it is possible to design a six-foot long boat which would pass the proposed test while floating absolutely upright with the bow pointed to the sky.

This comment is rejected. Under §§ 183.220(f) and 183.320(f) a boat has to be keel down in the water. Furthermore, tests have shown that a boat in an attitude with the bow extremely high does not pass the stability test.

Flotation materials and air chambers. One commentor suggested that the physical properties of foam flotation material be specified in §§ 183.110, 183.222 and 183.322. These sections contain requirements for flotation materials. This suggestion is being studied and may be the subject of future rulemaking.

One commentor suggested that rigid hull boats under 10 feet in length be permitted to use flotation air chambers that are integral with the hull. The commentor's reason is that air chambers provide more buoyancy and are less expensive than foam.

Under these rules, only boats that are rated for two horsepower or less are allowed to use integral air chambers for flotation. The reason for this rule is that because of their slow speed, boats with low horsepower engines are less likely to puncture an integral hull air chamber than are boats with high horsepower engines. If boats are allowed to use integral air chambers regardless of motor size, they will be less safe than if they meet the requirements of this regulation. For these reasons, this comment is rejected.

Table of Outboard Motor Weights. One commentor suggested that Table 4, which lists weights of outboard engines, include an additional category for engines of two horsepower or less. The lowest weights listed in the table are for 3.9 horsepower engines. The commentor claimed that these weights are excessive if a boat is rated for two horsepower or less because it requires the boat to have an unnecessary amount of flotation. This suggestion is accepted. A new weight category for engines rated for two horsepower or less is added to the regulation to give boat manufacturers the benefit of using less flotation in boats rated for two horsepower or less.

Visibility. Another commentor suggested that the Coast Guard initiate a rulemaking project that would require retroreflective treatments on all personal flotation devices. This treatment would enhance the objective of the level flotation regulation by increasing the visibility of a boater in distress at night. This suggestion is being considered in connection with a project on night time visibility.

PREPARATION OF COMPLIANCE GUIDELINE

A grant has been awarded to the American Boat and Yacht Council, Inc. (ABYC) under §§ 25 and 27(d) of the Federal Boat Safety Act of 1971 (46 U.S.C. 1451.) Under the grant, ABYC is preparing a compliance manual for these regulations. The manual will contain explanatory and interpretative information, illustrations, and diagrams to aid manufacturers in complying with the regulations. The manual will not dictate the method a manufacturer must follow to comply with the regulations, but it will be a guide to methods that, if followed, will be acceptable to the Coast Guard as meeting the intent and purpose of the rules. The manual will be distributed by the Coast Guard through the National Technical Information Service and will be available to the public at cost before this rule is effective.

ECONOMIC IMPACT

This rule has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 CFR 16200). The economic impacts, and the evaluation of benefits of these regulations have been carefully evaluated. The regulations should result in a cost to industry of approximately $5 million to 16 million per year. These industry costs should result in an increased cost to the consumer of 1 percent to 5 percent, depending on the size of the boat purchased. The benefit of the regulations is a savings of several hundred lives per year.

AUTHORITY

This regulation is adopted under authority of the Federal Boat Safety Act of 1971 (46 U.S.C. 1454). The authority vested in the Secretary of the Department of Transportation by the Act is delegated to the Commandant of the Coast Guard at 49 CFR 1.46(n)(1).

Accordingly, the amendments are adopted with changes as set forth below.

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: April 8, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

Subpart E—Flotation

1. By amending Subpart E by revising § 183.61 to read as follows:

§ 183.61 Applicability.

This subpart applies to monohull boats, the construction or assembly of which is begun after July 31, 1973, but before August 1, 1978, that are less than 20 feet in length, except monohull boats that meet the requirements of Subparts F, G, or H of this Part, sailboats, canoes, kayaks, inflatable boats, submersibles, surface effect vessels, amphibious vessels, and raceboats.

2. By adding new subparts F, G, and H to follow Subpart E and to read as follows:

Subpart F—Flotation Requirements for Inboard Boats, Inboard/Outdrive Boats, and Airboats

Sec.
183.101 Applicability.
183.105 Quantity of flotation required.
183.110 Flotation materials and air chambers.

Subpart F—Flotation Requirements for Inboard Boats, Inboard/Outdrive Boats, and Airboats

§ 183.101 Applicability.

This subpart applies to monohull inboard boats, inboard/outdrive boats, and airboats less than 20 feet in length, the construction or assembly of which is begun after July 31, 1978, except sailboats, canoes, kayaks, inflatable boats, submersibles, surface effect vessels, amphibious vessels, and raceboats.

§ 183.105 Quantity of flotation required.

(a) Each boat must have enough flotation to keep any portion of the boat above the surface of the water when the boat has been submerged in calm, fresh water for at least 18 hours and loaded with—

(1) A weight that, when submerged, equals two-fifteenths of the persons capacity marked on the boat;

(2) A weight that, when submerged, equals 25 percent of the dead weight; and

(3) A weight in pounds that, when submerged, equals 62.4 times the volume in cubic feet of the two largest air chambers, if air chambers are used for flotation.

(b) For the purpose of this section, "dead weight" means the maximum weight capacity marked on the boat minus the persons capacity marked on the boat.

§ 183.110 Flotation materials and air chambers.

(a) As installed in a boat, flotation materials must withstand—

(1) The combined effects of contact with oil, oil products, or other liquids or compounds with which the material may be expected to come in contact during normal use; and

(2) The combined effects of exposure to sunlight, vibration, shock, and temperature variations expected during normal use.

(b) Air chambers used to meet the flotation requirements of this subpart must not be integral with the hull.

Subpart G—Flotation Requirements for Outboard Boats Rated for Engines of More Than 2 Horsepower

GENERAL

Sec.
183.201 Applicability.
183.202 Flotation requirements.
183.205 Passenger carrying area.
183.210 Reference areas.
183.215 Reference depth.
183.220 Preconditioning for tests.
183.222 Flotation material and air chambers.

TESTS

183.225 Flotation test for persons capacity.
183.230 Stability test.
183.235 Level floation test without weights for persons capacity.

Subpart G—Flotation Requirements for Outboard Boats Rated for Engines of More Than 2 Horsepower

GENERAL

§ 183.201 Applicability.

(a) This subpart applies to monohull outboard boats that are—

(1) Less than 20 feet in length;

(2) Rated for outboard engines of more than 2 horsepower; and

(3) Constructed or assembled after July 31, 1978.

(b) This subpart does not apply to sailboats, canoes, kayaks, inflatable boats, submersibles, surface effect vessels, amphibious vessels, and raceboats.

§ 183.202 Flotation and certification requirements.

Each boat to which this subpart applies must be manufactured, constructed, or assembled to pass the stability and flotation tests prescribed in §§ 183.225 (a), 183.230(a), and 183.235(a).

§ 183.205 Passenger carrying area.

(a) For the purpose of this section a boat is level when it is supported on its keel at the two points shown in Figure 2.

(b) As used in this subpart, the term "passenger carrying area" means each area in a boat in which persons can sit in a normal sitting position or stand while the boat is in operation. Passenger carrying areas are illustrated in Figures 3 through 8.

(c) The length of the passenger carrying area is the distance along the centerline of the boat between two vertical lines, one at the forward end and one at the aft end of the passenger carrying area, when the boat is level as illustrated in Figures 3 and 4. For boats with a curved stem inside the passenger carrying area, the forward vertical line is where a line 45 degrees to the horizontal when the boat is level is tangent to the curve of the stem, as illustrated in Figure 5. For boats with cabins, the forward vertical line is where there is a minimum distance of two feet between the inside top of the cabin and the water line formed when the boat is swamped and loaded with weights under § 183.220 as illustrated in Figure 6.

(d) The breadth of each passenger carrying area is the distance between two vertical lines at the mid-length, excluding consoles, of the passenger carrying area when the boat is level as illustrated in Figures 7 and 8. For boats with round chines inside the passenger carrying area, the vertical line is where a transverse line 45 degrees to the horizontal is tangent to the arc of the chine, as illustrated in Figure 8.

§ 183.210 Reference areas.

(a) The forward reference area of a boat is the forward most 2 feet of the top surface of the hull or deck, as illustrated in Figure 9.

(b) The aft reference area of a boat is the aft most two feet of the top surface of the hull or deck, as illustrated in Figure 9.

§ 183.215 Reference depth.

Reference depth is the minimum distance between the upper most surface of the submerged reference area of a boat and the surface of the water measured at the centerline of the boat, as illustrated in Figure 10. If there is no deck surface at the centerline of the boat from which a measurement can be made, the reference depth is the average of two depth measurements made on opposite sides of, and at an equal distance from, the centerline of the boat.

§ 183.220 Preconditioning for tests.

A boat must meet the following conditions for at least 18 hours before the tests required by §§ 183.225, 183.230, and 183.235:

(a) Manufacturer supplied permanent appurtenances such as windshields and convertible tops must be installed on the boat.

(b) The boat must be loaded with a quantity of weight that, when submerged, is equal to the sum of the following:

(1) The sum of 50 percent of 550 pounds of the persons capacity marked on the boat and 12½ percent of the remainder of the persons capacity.

(2) Twenty-five percent of the result of the following calculation, but not less than zero: the maximum weight capacity marked on the boat; less the weight shown in Column 6 of Table 4 for maximum horsepower marked on the boat; less the persons capacity marked on the boat.

(c) The weights required by paragraph (b) of this section must be placed in the boat so that the center of gravity of each amount of weight required by paragraphs (b) (1) and (b) (2) of this section is within the shaded area illustrated in Figure 11. The location and dimensions of the shaded area are as follows:

(1) the shaded area is centered at the mid-length of the passenger carrying area and at the mid-breadth of the boat;

(2) the length of the shaded area, measured along the centerline of the boat, is equal to 40 percent of the length of the passenger carrying area of the boat; and

(3) the breadth of the shaded area, measured at the midlength of the passenger carrying area, is equal to 40 percent of the breadth of the passenger carrying area of the boat.

(d) Weight must be placed in the normal operating position of the motor and controls and the battery in lieu of this equipment. The required quantity of weight used for this purpose depends upon the maximum rated horsepower of the boat being tested and is specified in Columns 2 and 4 of Table 4 for the swamped weight of the motor and controls and for the submerged weight of the battery, respectively.

(e) Permanent fuel tanks must be filled with fuel and each external opening into the fuel tank must be sealed.

(f) The boat must be keel down in the water.

(g) The boat must be swamped, allowing water to flow between the inside and outside of the boat, either over the sides, through a hull opening, or both. Entrapped air in the flooded portion of the boat must be eliminated.

(h) Water must flood the two largest air chambers and all air chambers integral with the hull.

§ 183.222 Flotation material and air chambers.

(a) As installed in a boat, flotation materials must withstand—

(1) The combined effects of contact with oil, oil products, or other liquids or compounds with which the material may be expected to come in contact during normal use; and

(2) The combined effects of exposure to sunlight, vibration, shock, and temperature variations expected during normal use.

(b) Air chambers used to meet the flotation requirements of this subpart must not be integral with the hull.

TESTS

§ 183.225 Flotation test for persons capacity.

Flotation standard. When the conditions prescribed in § 183.220 are met, the boat must float in fresh, calm water as follows:

(a) The angle of heel does not exceed 10 degrees from the horizontal.

(b) Any point on either the forward or aft reference area is above the surface of the water.

(c) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 6 inches or less.

§ 183.230 Stability test.

(a) *Flotation standard.* When the conditions prescribed in § 183.220 (a), (d) through (h) and paragraphs (b) and (c) of this section are met, the boat must float in fresh, calm water as follows:

(1) The angle of heel does not exceed 30 degrees from the horizontal.

(2) Any point on either the forward or aft reference area is above the surface of the water.

(3) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 12 inches or less.

(b) *Quantity of weight used.* Load the boat with a quantity of weight that, when submerged, is equal to the sum of the following:

(1) One-half of the quantity of weight required by § 183.220(b)(1).

(2) The quantity of weight required by § 183.220(b)(2).

(c) *Placement of quantity of weight: starboard side.* Place the weight required by paragraph (b) of this section in the boat so that—

(1) The quantity of weight required by § 183.220(b)(2) is positioned in accordance with § 183.220(c); and

(2) One-half the quantity of weight required by § 183.220(b)(1) is uniformly distributed over a distance along the outboard perimeter of the starboard side of the passenger carrying area that is equal to at least 30 percent of the length of the passenger carrying area so that the center of gravity of the quantity of weight is located within the shaded area illustrated in Figure 12, the center of gravity of the amount of weight placed on the floor of the boat is at least 4 inches above the floor, and the center of gravity of the amount of weight placed on a seat is at least 4 inches above the seat. The location and dimensions of the shaded area are as follows:

(i) The shaded area is centered at the mid-length of the passenger carrying area;

(ii) The length of the shaded area is equal to 70 percent of the length of the passenger carrying area; and

(iii) The breadth of the shaded area is 6 inches from—

(A) For weights placed on the floor, the outboard perimeter of the passenger carrying area; and

(B) For weights placed on a seat, a vertical line inside the passenger carrying area as illustrated in Figure 13.

(d) *Placement of quantity of weight: port side.* The quantity of weight required by paragraph (b)(1) of this section is placed along the port side of the passenger carrying area in accordance with the conditions prescribed in paragraph (c)(2) of this section.

§ 183.235 Level flotation test without weights for persons capacity.

When the conditions prescribed in § 183.220(a), (d) through (h) are met, the boat must float in fresh, calm water as follows:

(a) The angle of heel does not exceed 10 degrees from the horizontal.

(b) Any point on either the forward or aft reference area is above the surface of the water.

(c) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 6 inches or less.

Subpart H—Flotation Requirements for Outboard Boats Rated for Engines of 2 Horsepower or Less

GENERAL

183.301 Applicability.
183.302 Flotation requirements.
183.305 Passenger carrying area.
183.310 Reference areas.
183.315 Reference depth.
183.320 Preconditioning for tests.
183.322 Flotation materials.

TESTS

183.325 Flotation test for persons capacity.
183.330 Stability test.
183.335 Level flotation test without weights for persons capacity.

Subpart H—Flotation Requirements for Outboard Boats Rated for Engines of 2 Horsepower or Less

GENERAL

§ 183.301 Applicability.

(a) This subpart applies to monohull boats that are—

(1) Less than 20 feet in length;

(2) Rated for manual propulsion or outboard engines of 2 horsepower or less; and

(3) Constructed or assembled after July 31, 1978.

(b) This subpart does not apply to sailboats, canoes, kayaks, inflatable boats, submersibles, surface effect vessels, amphibious vessels, and raceboats.

§ 183.302 Flotation requirements.

Each boat to which this subpart applies must be manufactured, constructed, or assembled to pass the stability and flotation tests prescribed in § 183.325(a), 183.330(a), and 183.335(a).

§ 183.305 Passenger carrying area.

(a) For the purpose of this section, a boat is level when it is supported on its keel at the two points shown in Figure 2.

(b) As used in this subpart, the term "passenger carrying area" means each area in a boat in which persons can sit in a normal sitting position or stand while the boat is in operation. Passenger carrying areas are illustrated in Figures 3 through 8.

(c) The length of each passenger carrying area is the distance along the centerline of the boat between two vertical lines, one at the forward end and one at the aft end of the passenger carrying area, when the boat is level, as illustrated in Figures 3 and 4. For boats with a curved stem inside the passenger carrying area, the forward vertical line is where a line 45 degrees to the horizontal when the boat is level is tangent to the curve of the stem, as illustrated in Figure 5. For boats with cabins, the forward vertical line is where there is a minimum distance of two feet between the inside top of the cabin and the water line formed when the boat is swamped and loaded with weights under § 183.220 as illustrated in Figure 6.

(d) The breadth of the passenger carrying area is the distance between two vertical lines at the mid-length, excluding consoles, of the passenger carrying area when the boat is level as illustrated in Figures 7 and 8. For boats with round chines inside the passenger carrying area, the vertical line is where a transverse line 45 degrees to the horizontal is tangent to the arc of the chine, as illustrated in Figure 7.

§ 183.310 Reference areas.

(a) The forward reference area of a boat is the forward most 2 feet of the top surface of the hull or deck as illustrated in Figure 9.

(b) The aft reference area of a boat is the aft most two feet of the top surface of the hull or deck, as illustrated in Figure 9.

§ 183.315 Reference depth.

Reference depth is the minimum distance between the upper most surface of the submerged reference area of a boat and the surface of the water measured at the centerline of the boat, as illustrated in Figure 10. If there is no deck surface at the centerline of the boat from which a measurement can be made, the reference depth is the average of two depth measurements made on opposite sides of, and at an equal distance from, the centerline of the boat.

§ 183.320 Preconditioning for tests.

A boat must meet the following conditions for at least 18 hours before the tests required by §§ 183.325, 183.330, and 183.335:

(a) Manufacturer supplied permanent appurtenances such as windshields, and convertible tops must be installed on the boat.

(b) The boat must be loaded with a quantity of weight that, when submerged, is equal to the sum of the following:

(1) Two-fifteenths of the persons capacity marked on the boat.

(2) Twenty-five percent of the result of the following calculation, but not less than zero: the maximum weight capacity marked on the boat; less the weight shown in column 6 of Table 4 for the maximum horsepower marked on the boat; less the persons capacity marked on the boat.

(c) The weights required by paragraph (b) of this section are placed in the boat so that the center of gravity of each amount of weight required by subparagraphs (b)(1) and (b)(2) of this section is within the shaded area illustrated in Figure 11. The location and dimensions of the shaded area are as follows:

(1) the shaded area is centered at the mid-length of the passenger carrying area and at the mid-breadth of the boat;

(2) the length of the shaded area, measured along the centerline of the boat, is equal to 40 percent of the length of the passenger carrying area of the boat; and

(3) the breadth of the shaded area, measured at the mid-length of the passenger carrying area, is equal to 40 percent of the breadth of the passenger carrying area of the boat.

(d) Weight must be placed in the normal operating position of the motor and controls in lieu of this equipment. The quantity of weight used for this purpose depends upon the maximum rated horsepower of the boat being tested and is specified in Column 2 of Table 4 for the swamped weight of the motor and controls.

(e) Permanent fuel tanks must be filled with fuel and each external opening into the fuel tank must be sealed.

(f) The boat must be keel down in the water.

(g) The boat must be swamped, allowing water to flow between the inside and the outside of the boat, either over the sides, through a hull opening, or both. Entrapped air in the flooded portion of the boat must be eliminated.

§ 183.322 Flotation materials.

As installed in a boat, flotation materials must withstand—

(a) The combined effects of contact with oil, oil products, or other liquids or compounds with which the material may be expected to come in contact during normal use; and

(b) The combined effects of exposure to sunlight, vibration, shock, and temperature variations expected during normal use.

§ 183.325 Flotation test for persons capacity.

Flotation standard. When the conditions prescribed in § 183.320 are met, the boat must float in fresh, calm water as follows:

(a) The angle of heel does not exceed 10 degrees from the horizontal.

(b) Any point on either the forward or aft reference area is above the surface of the water.

(c) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 6 inches or less.

§ 183.330 Stability test.

(a) *Flotation standard.* When the conditions prescribed in § 183.320(a), (d) through (g) and paragraphs (b) and (c) of this section are met, the boat must float in fresh, calm water as follows:

(1) The angle of heel does not exceed 30 degrees from the horizontal.

(2) Any point on either the forward or aft reference area is above the surface of the water.

(3) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 12 inches or less.

(b) *Quantity of weight used.* Load the boat with quantity of weight that, when submerged is equal to the sum of the following:

(1) One-half the quantity of weight required by § 183.320(b)(1).

(2) The quantity of weight required by § 183.320(b)(2).

(c) *Placement of quantity of weight starboard side.* Place the quantity of weight required by paragraph (b) of this section in the boat so that—

(1) The quantity of weight required by § 183.320(b)(2) is positioned in accordance with § 183.320(c); and

(2) One-half the quantity of weight required by § 183.320(b)(1) is uniformly distributed over a distance along the outboard perimeter of the starboard side of the passenger carrying area that is equal to at least 30 percent of the length of the passenger carrying area so that the center of gravity of the quantity of weight is located within the shaded area illustrated in Figure 12, the center of gravity of the amount of weight placed on the floor of the boat is at least 4 inches above the floor and the center of gravity of the amount of weight placed on a seat is at least 4 inches above the seat. The location and dimensions of the shaded area are as follows:

(i) The shaded area is centered at the mid-length of the passenger carrying area;

(ii) The length of the shaded area is equal to 70 percent of the length of the passenger carrying area; and

(iii) The breadth of the shaded area is 6 inches from—

(A) For weights placed on the floor, the outboard perimeter of the passenger carrying area; and

(B) For weights placed on a seat, a vertical line inside the passenger carrying area as illustrated in Figure 13.

(d) *Placement of quantity of weight: port side.* The quantity of weight required by paragraph (b)(1) of this section is placed along the port side of the passenger carrying area in accordance with the conditions prescribed in paragraph (c)(2) of this section.

§ 183.335 Level flotation test without weights for persons capacity.

When the conditions prescribed in § 183.320(a), (d) through (g) are met, the boat must float in fresh, calm water as follows:

(a) The angle of the heel does not exceed 10 degrees from the horizontal.

(b) Any point on either the forward or aft reference area is above the surface of the water.

(c) The reference depth at the reference area that is opposite the reference area that is above the surface of the water is 6 inches or less.

TABLE 4.—*Weights (pounds) of outboard motor and related equipment for various boat horsepower ratings*

Boat horsepower rating	Column No. 1	2	3	4	5	6
	Motor and control weight		Battery weight		Full portable fuel tank weight	1+3+5
	Dry	Swamped	Dry	Submerged		
0.1 to 2	25	20				25
2.1 to 3.9	35	30				35
4.0 to 7	55	48			25	80
7.1 to 15	75	65	20	11	50	145
15.1 to 25	100	88	45	25	50	195
25.1 to 45	155	135	45	25	100	300
45.1 to 80	240	210	45	25	100	385
80.1 to 150	315	275	45	25	100	460
150.1 to 250	420	300	45	25	100	565
TRANSOMS DESIGNED FOR TWIN MOTORS						
80.1 to 90	310	270	90	50	100	500
90.1 to 160	480	420	90	50	100	670
160.1 to 300	650	550	90	50	100	840

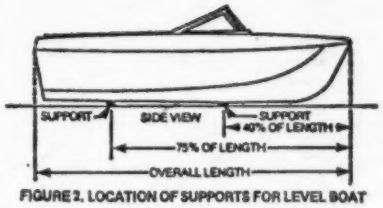

FIGURE 2. LOCATION OF SUPPORTS FOR LEVEL BOAT

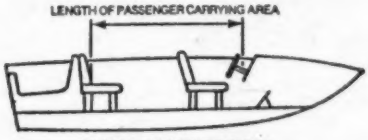

FIGURE 3. BOAT WITH DECK

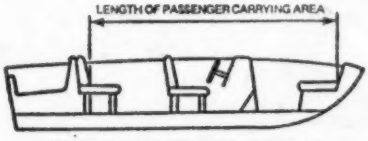

FIGURE 4. BOAT WITH CENTER CONSOLE

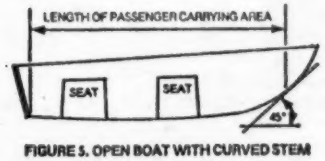

FIGURE 5. OPEN BOAT WITH CURVED STEM

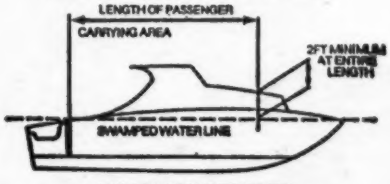

FIGURE 6. BOAT WITH CABIN

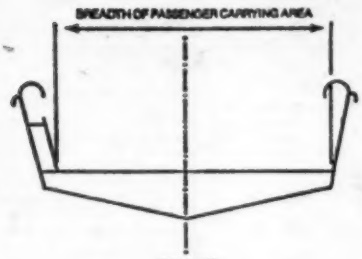

FIGURE 7.

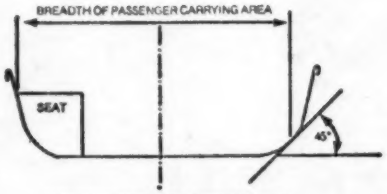

FIGURE 8. BOAT WITH ROUND CHINE

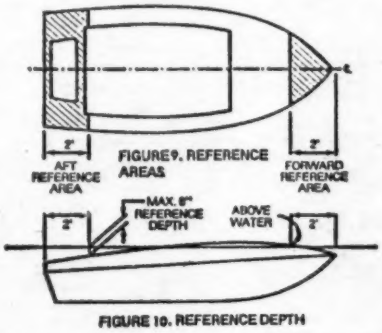

FIGURE 9. REFERENCE AREAS

FIGURE 10. REFERENCE DEPTH

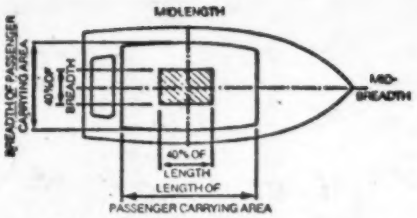

FIGURE 11. PASSENGER CARRYING AREA: LOCATION OF CENTER OF GRAVITY OF WEIGHTS

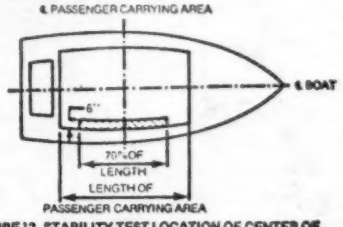

FIGURE 12. STABILITY TEST LOCATION OF CENTER OF GRAVITY OF WEIGHTS: STARBOARD SIDE

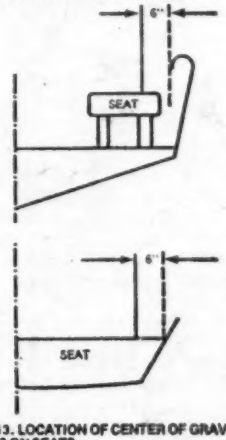

FIGURE 13. LOCATION OF CENTER OF GRAVITY OF WEIGHTS ON SEATS

[FR Doc.77-11074 Filed 4-15-77;8:45 am]